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ABSTRACT

Compiled in this teacher's guide are suggestiops for using the student booklet, ECKY SAYS, "BRUSH UP ON YOUR ECOLOGY," SE 016 486. A variety of interdisciplinary activities are offered, together with ideas for multimedia instruction and background subject information. Basic environmental concepts and a series of questions to evaluate objectives are also given. This work was prepared under an ESEA Title III contract for the Interdisciplinary Environmental Education K-12 project. (BL)

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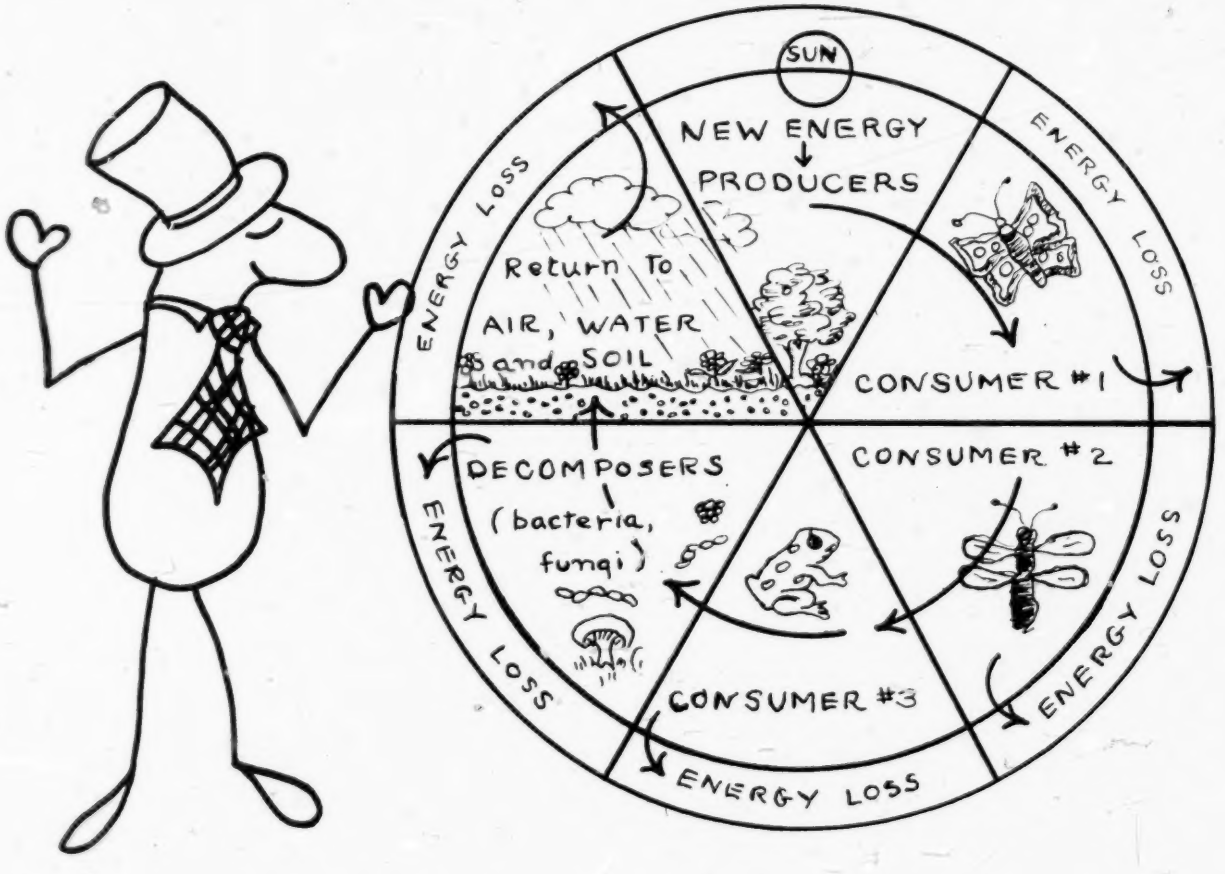
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

A Teacher's Guide to the Study of ECOLOGICAL TERMS for Intermediate and Middle School

INTERDISCIPLINARY ENVIRONMENTAL EDUCATION

AN ESEA TITLE III PROJECT
BASED AT NOVA HIGH SCHOOL
BROWARD COUNTY, FLORIDA



SE 016 489

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INTERDISCIPLINARY ENVIRONMENTAL EDUCATION
An ESEA Title III Project

A TEACHER'S GUIDE TO THE STUDY OF ECOLOGICAL TERMS

For Intermediate and Middle School

CONCEPTS

1. Environment is the sum total of all living and non-living things that influence an organism.

   (a) All things on earth are in some way interrelated (acting upon one another).

   (b) Ecology is the study of the interrelationships of all living and non-living things.

   (c) Living things interacting with one another in an environment are called a community.

   (d) The community together with the non-living factors affecting that community comprise an ecosystem.

2. All organisms are interrelated through matter and energy.

   (a) All organisms are interrelated through food relationships.

   (b) The producers are largely green plants which convert the sun's energy and non-living materials into food for other living things.

   (c) The consumers are the organisms that feed on the green plants or that feed on other organisms which have fed on green plants.

   (d) Decomposers are organisms (bacteria, fungi, toadstools) that decay or break down other materials, returning the elements of which they are made to the soil, air, and water.

CONCEPTS - 2. (Cont'd.)

(e) This relationship of producers, consumers, and decomposers which transfers matter and energy from one organism to another is referred to as a food chain.

(f) Because many organisms are part of different food chains, we say they make a food web.

3. All organisms require energy which is continually supplied by the sun.

(a) Energy is supplied to an ecosystem by the activities of green plants.

(b) The earth receives a constant input of energy from the sun. The part of this energy that is trapped by green plants serves as the basis for life.

(c) Energy gives organisms the ability or active strength to do things, such as grow, move, play, work, reproduce, and change.

OBJECTIVES

After completing "The Study of Ecological Terms," the pupil should be able to respond correctly to at least 8 of the following 14 questions and activities. The evaluation may be dictated or given to the pupil in written form.

1. Environment is

   (a) everything surrounding an organism
   (b) the out-of-doors
   (c) a kind of metal
   (d) earth and plants

2. Which of the following is interrelated with you?

   (a) a drought in the Everglades
   (b) algae in the Gulf of Mexico
   (c) an iceberg
   (d) all of these

3. Ecology is the

   (a) study of pollution
   (b) study of conservation
   (c) study of how modern technology can be improved to stop pollution
   (d) study of the interrelationships of all living and non-living things

4. Which of the following are good examples of "organisms"?

   (a) a kangaroo, an iceberg, a shark
   (b) a palm tree, an ant, a paramecium
   (c) a germ, a grain of sand, a drop of water
   (d) all of these

5. The basic source of all energy on earth is

   (a) the food chain
   (b) producers
   (c) consumers
   (d) the sun

OBJECTIVE (Cont'd.)

6. A tiger is a good example of

(a) a decomposer
(b) an herbivore
(c) a consumer
(d) a scavenger

7. Energy is supplied to an ecosystem through the activities of which of the following?

(a) grass
(b) moss
(c) algae
(d) all of these

8. Fungi, yeasts, and decay bacteria

(a) depend solely upon living material for energy
(b) are all referred to as consumers
(c) are all referred to as decomposers
(d) are generally harmful to the environment

9. Energy is necessary to man because without it he could not

(a) work
(b) grow
(c) move
(d) all of these

10. Producers

(a) form the base level of food relationships
(b) manufacture food for themselves and other living organisms
(c) are generally green plants
(d) all of the above

11. Which of the following is a good example of an ecosystem?

(a) a concrete sidewalk
(b) a map of Africa
(c) a tree
(d) all of these

OBJECTIVE (Cont'd.)

12. Draw a food chain with at least three members. Label each.

13. List five ways in wh mathematics might be related to a bee.

14. Write the following words under the proper headings.

Living	Non-living
a cloud	
a cat	
water	
bacteria	
sand	
hibiscus	
a car	
a mink coat	

MATERIALS

(Produced for this study by the IEE Project)

ECKY SAYS: BRUSH UP ON YOUR ECOLOGY

A simply written and illustrated booklet defining and explaining ecological terms: environment, interrelationships, ecology, organism, energy, food chain, food web, producers, consumers, decomposers, energy cycle, and ecosystem.*

MATTER AND ENERGY CYCLE WHEEL

A color, cut-out, and assemble wheel depicting the matter and energy cycle.*

*In the event these materials are unavailable, patterns and texts for duplication have been provided in this guide.

RECOMMENDED COUNTY FILMS

F550-3207
YOUR ENVIRONMENT IS THE EARTH - 12 min./color - The film journeys from the polar ice caps to the Northern Tundra, from the forests of the temperate zone to tropical jungles and from outer space to the ocean depths to demonstrate that our environment is our surroundings. - Middle/High.

F500.3167
OBSERVING AND DESCRIBING - 12-1/2 min./color - Excellent presentation on employing the five senses in making observations and creatively describing one's observations. - Primary/Inter.

F581.5-2005
TREE, THE - 10 min./color - The words "interrelationship" and "pollution" are introduced. Viewers are told to look for interrelationships of everything shown on and near the tree. Excellent introduction for young viewers. - Primary/Inter.

F551.44-3125
CAVE ECOLOGY - 10 min./color - Excellent, shows simple food web and simple ecological system. Stresses importance of each link in chain. Stimulates analogies to spaceship earth. Inter./Middle.

F574.5-2887
PLANT-ANIMAL COMMUNITIES: INTERRELATIONSHIPS - 13-1/2 min./color - Basic to the study of ecology is an understanding of the two major kinds of interrelationships among living things - symbiosis and antagonism. The pattern of life in any biome is intricately involved in these partnerships. Introductory study advisable. - Middle/High.

F591.5-3080
WHAT ECOLOGISTS DO - 15-1/2 min./color - This overview film defines ecology and explains the roles of ecologists in studying the interrelationships between organisms and their environments. Excellent as introduction to subject. Because of its practical work-oriented approach, this film may also be used effectively in vocational guidance classes. - Inter./Middle.

F574.5-0684
WHAT IS ECOLOGY? - 11 min./color - Introduces the study of ecology by illustrating the wide variety of interrelationships, etc. Helps to interpret for the student the meaning of the science that deals with interrelationships between living plants and animals and their environment. Describes aspects of the physical and living environments that exist in a community and both explains and exemplifies the term "biome." - Middle/High.

RECOMMENDED COUNTY FILMS (Cont'd.)

F574-665
LIFE IN A DROP OF WATER - 11 min./color - Microorganisms are seen through a microscope, in a drop of water. Amoeba, spirogyra, and the paramecium are examples used to illustrate the most basic of life forms. - Inter./Middle/High.

F539.2-503
ENERGY - 13 min./B&W - What is energy? What is potential energy? What is kinetic energy? Why even "inert" substances have energy. How energy from the sun is changed to energy we can use: coal, food, etc. Forms of energy: mechanical, electrical, heat, chemical. How energy is changed from one form to another. - Inter./Middle/High.

F531-415
ENERGY AND ITS FORMS - 11 min./color - Explains the basic concept of energy and shows examples of its principal forms, including nuclear energy. Shows how energy is changed from one form to another, how plants convert the energy of the sun to chemical energy. - Inter./Middle.

F551.46-3433
FOOD CHAINS IN THE OCEAN - 9 min./color - Organisms that live in the ocean are dependent upon each other. Food chains and food webs form as the energy requirements of living are satisfied. - Inter./Middle.

F574.5-2747
MAN, BEAST AND THE LAND PARTS I AND II - 52 min./color - This film gives the viewer a close look at the ecological relationships that dominate the Serengeti-Mara plainlands of East Africa. It provides a very realistic experience similar to that which one might have by going on a Safari. - Inter./Middle/High.

F634.9-1072
LIFE IN THE FOREST - 11 min./color - Deals with numerous interrelationships of the forest; food chain, types of consumers, function of numerous tiny creatures. - Inter./Middle/High.

F595.7-838
INSECTS - 11 min./color - Good description and illustrations of insects, the species most competitive to man; how to encourage and combat them. - Middle/High.

F574.1-671
FOOD: ENERGY FROM THE SUN - 9-1/2 min./color - Simple, clear explanation of the energy route from sun to plants, to animals. We move, work, play, and grow because of the energy we get from food. - Primary/Inter.

RECOMMENDED COUNTY FILMS (Cont'd.)

F591.5-3030
ANIMAL PREDATORS AND THE BALANCE OF NATURE - 10 min./color - Observation of predators on the land, in the sea, and in the sky lead the student into an investigation of the role predators play. It is also a demonstration of what is meant by the balance of nature. - Inter./Middle.

F919.9-3223
ECOLOGICAL SYSTEMS: ANTARCTICA - 14 min./color - The interrelationship of all living and non-living factors in this refreshingly different ecosystem make for a delightful lesson in ecology. Inter./Middle/High.

F574.5-0674
DESERT, THE - 22 min./color - Illustrates the interrelationships between plants and animal life and the physical environment of the desert. Geographical locations of desert areas, their ecological conditions, causes of their formation, and their aridity are shown. Describes adaptive mechanisms of a wide diversity of plant and animal life to this environment. - Middle/High.

F917.59-1739
EVERGLADES: CONSERVING A BALANCED COMMUNITY, THE - 11 min./color - Excellent film on Everglades mangrove estuaries showing the many communities and interrelationships. Water requirements of expanding human communities are endangering many species of wildlife. - Middle/High.

F591.55-3379
COMMUNITY BENEATH THE SEA, A - 9-1/4 min./color - The viewers are asked to observe the behaviors of living things in a model community and to attempt to decide what a community is. An ocean reef community serves as the model. - Middle.

PROCEDURES

I.

Introduce the booklet ECKY SAYS: BRUSH UP ON YOUR ECOLOGY to class. Let pupils suggest what word "Ecky" stands for (Ecology).

Read first page: "Environment. The sum total of all living and non-living things."

Show county films "Your Environment Is the Earth" - 550-3207 and "Observing and Describing" - 500-3167.

After discussing the exploration and observation of the environment through the five senses, have the children suggest ways in which we might record our observations (for others to share and for us to refer back to). Suggestions: written symbols and words, audio and visual recording (camera, tape recorder, etc.), illustrations, sample collections.

Conduct "mystery games" letting children identify:

1. Sounds recorded on a tape recorder (footsteps, running water, airplane overhead, sound of the ocean, wind, typewriter, closing of a door, etc.).

2. Smells - put objects or pieces of cotton soaked with liquids in covered jars (alcohol, perfume, onion juice, cloves, cinnamon, tree bark and leaves, etc. Be careful not to include materials which might be harmful, such as airplane glue, paint removers, etc.).

3. Objects by touch - make a "Touch box" into which the students insert their hands from the side. Put five or six distinctive feeling materials in the box (bark, sandpaper, cooked noodles, satin, wool, a page of braille, etc.)

4. Objects to taste - (varied foods with sweet, sour, salty, bland, and "hot" tastes) emphasize that the senses of smell and feel within the mouth are used here also.

5. For the sense of sight play games such as asking the children to look up and remember what color the shirt or blouse of the person in front of them is. Have them look to one side of the room and ask questions about what is on the other side (i.e., how many windows are in our room, what three objects are on the front table, etc.). Hold up posters with various objects scotch taped to them or pictures of objects on them. Show each for a limited time, then have the pupils list as many objects as they can remember. (This could be extended into a spelling lesson.)

PROCEDURES (Cont'd.)

Go on an observation walk in the schoolyard. Have pupils take pencil and paper to record at least two things they observe through each of the four senses (touch, smell, hear, see).

Write column headings "living" and "non-living" on the chalk board. Each pupil names one thing from his observation list and other pupils decide under which heading that object belongs. Have pupils copy this list for their notebooks for future reference.

Conduct discussion on words "Structure" (the way an object is constructed or the way its parts are arranged) and "Function" (normal action or use - purpose). All living things have both. Each pupil then chooses one object from his observation list and must illustrate its structure and write a brief description of its function. (Research time and materials should be provided.)

These studies should be included in notebooks after evaluation.

Math-related activity:

Each pupil should attempt to list at least 10 ways in which math is related to the study of his object. Example: an ant

1. how long is the ant?
2. how much does it weigh?
3. how much food does an ant require in a day, a week, etc.?
4. how long does an ant live?
5. how much weight can an ant carry?
6. how many kinds of ants are there in the world?
7. how many ants live in a colony?
8. within what temperature limits can an ant survive?
9. how long have ants been in existence?
10. how many eggs does an ant mother lay?

Pupils may make up mathematical problems for teacher to duplicate for entire class to work.

Have pupils share information about their object with the rest of the class through oral report, cartoon, illustration, demonstration, dramatization, etc.

Have pupils prepare a display of pictures (magazines, art work, etc.) of various-sized environments - crack in a sidewalk, back yard, a pond, bedroom, classroom, father's office, spider web, etc.

PROCEDURES (Cont'd.)

Given the following example of environments and living things within them, have each pupil compose his own lists based on the letters of the word "ENVIRONMENT." (Encourage use of dictionaries, maps, globes, and references.)

Letter	Environment	Living Thing
E	- estuary	clams
N	- New Delhi	Indians
V	- vest-pocket	moth
I	- Italy	Sophia Loren
R	- reformatory	criminals
O	- Orient	Japanese people
N	- nest	bird
M	- mouth	bacteria
E	- elm (a tree)	insects
N	- nursery	trees and plants
T	- tundra	polar bears

Introduce prefixes "micro" and "macro," Greek terms meaning "small" and "large." Pupils may think of or look up words in which they are used as prefixes. Have pupils designate whether the environments listed on their "ENVIRONMENT" lists are "micro-environments" or "macro-environments" (for simplification the "bigger or smaller than a bread box theory" may be used).

Set up a micro-environment in your classroom - a terrarium, aquarium, ant farm, animals in cages, etc.

II.

Read second page of "Ecky" book: "Interrelationships. Acting upon one another." Discuss the relationships depicted.

Examine the word "interrelated" in terms of syllables, prefixes, suffixes, and root words.

Show county films "Tree, The" - 581.5-200, "Cave Ecology" - 551.44-3125, and "Plant-Animal Communities: Interrelationships" - 574.5-2887.

Instruct pupils to look for as many interrelationships as possible in the films.

PROCEDURES (Cont'd.)

Go on a "Tree walk." Each pupil should have paper, hard surface, and crayon. Choose one tree for all students to observe carefully. Have them employ their senses in observing the tree and all of its parts. If possible, have hand lenses available for discovering tiny things. Observe structure carefully - trunk, limbs, leaves, roots, etc. Urge the children to describe what they observe in as many different adjectives as possible - teacher records words either on tape recorder or paper. (Examples: color and shade words; size words such as long, short, stubby, immense, thin, microscopic; texture words such as rough, smooth, bumpy, sticky, scaly, soft, hard, pliable, and stiff; odor words such as pungent, sweet, woody, unpleasant, misty, moldy, fresh, earthy, piney, oily, etc.; sound words such as rustle of the leaves in the wind, whine of wind through the tree, crackle of dead leaves.) Ask children to name other living and non-living things on or near the tree.

Pupils find leaves under tree and make leaf patterns by rubbing crayon on paper with leaf (vein side up) beneath it. (Do not tear leaves from tree - return dead leaves to ground.)

Have each pupil write a "What Am I?" story. The clues should be primarily descriptive words and interrelationships. Pupils should in some way share stories with others (orally, if possible).

Study structure and function of leaves using science books, library books, films, filmstrips, etc.; emphasis on photosynthesis. Have pupils write description of structure and function of the leaf pattern they made on their "Tree walk."

III.

Read third page of "Ecky" book. "Ecology. The study of the interrelationships of all living things." Study and discuss the interrelationships depicted.

Show county films "What Ecologists Do" - 591.5-3080 and "What Is Ecology?" - 574.5-0684.

Assign pupils to find an article dealing with ecology from newspaper, magazine, or book, and to give speech to class summarizing the article. If class has done no public speaking, be sure to prepare them adequately. Point out that ecology concerns dealings between people; pollution control boards, zoning and planning boards, utility departments, health departments, commissions, citizens groups.

PROCEDURES (Cont'd.)

Take a field trip to a pollution control board meeting or commission meeting which will be dealing with some ecological problem.

Invite a speaker from some action group such as League of Women Voters or Broward County Environmental Protection group.

Make a class scrapbook of articles dealing with ecology. Let the children determine how to classify the articles.

IV.

Read fourth page of "Ecky" book. "Organisms. All living things." Discuss the pictures.

Review the lesson on living and non-living things.

Discuss large and small organisms. Point out that there are many tiny organisms, some which we hardly notice, others which cannot be seen with the naked eye. Have students go on a nature walk with hand lenses. Have them list things they find that they would not have noticed or observed clearly without the lens. (Description of organism is sufficient, identification not necessary.) In class have pupils choose one thing from their lists and illustrate it along with the other parts of its environment with which it interacts.

Have the students gather tiny wild flowers, press them, and glue them on note paper for gifts.

Show county film "Life in a Drop of Water" - 574-665.

Have the students bring in stagnant or pond water. Observe it under a microscope, looking for microorganisms. Consult science text or library science books concerning paramecium and amoeba, etc. (Example: Brandwein's Concepts in Science, Harcourt, Brace and World, Unit IV, Book V.)

Divide class into groups and assign topics for reports on unusual organisms (oral reports, illustrations, etc.).

Suggested topics: "The largest animal that ever lived," "The largest plant that ever existed," "The smallest animal that is living today," "One of the smallest commonly known plants," "The largest people on earth," "The smallest people on earth."

PROCEDURES (Cont'd.)

V.

Read the fifth page of "Ecky" book. "Energy. The ability or active strength to do anything."

Show county films "Energy" - 539.2-503 and "Energy and its Forms" - 531-415.

This might be a good time to cover the chapter(s) on energy in your science text(s). Use library books concerning energy. Perform experiments suggested.

VI.

Read and discuss sixth page of "Ecky" book. "Food Chains. Systems by which all organisms get energy through food."

Read "The Chain of Life" in the How and Why Wonder Book of Ecology by Shelly and Mary Louise Grossman (or comparable material).

Show county films "Food Chains in the Ocean" - 551.46-3433, "Man, Beast and the Land" Parts I and II - 574.5-2747, and "Life in the Forest" - 634.9-1072.

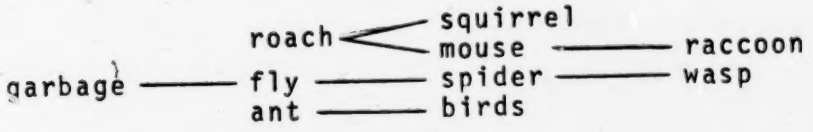
Have the pupils suggest various food chains in our area.

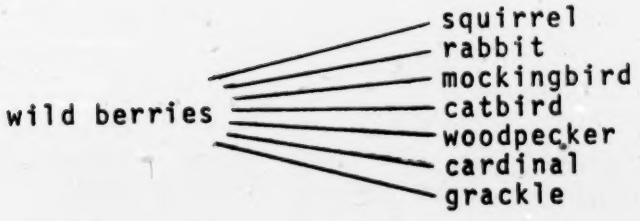
Give the pupils any of the food chains on the following list that they have not suggested themselves. Have them prepare a list for their notebooks.

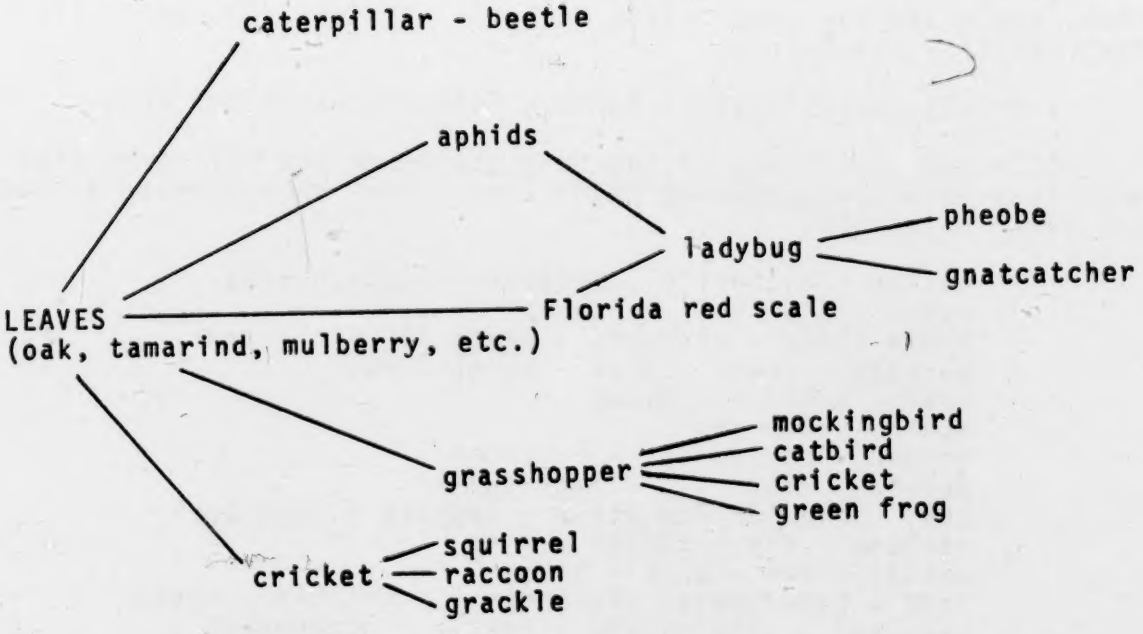
nectar - butterfly - dragonfly - green frog
acorn - squirrel - raccoon
human blood - mosquito - dragonfly - catbird
garbage - roach - mice - screech owl
leaf - aphid - ladybug
acorn - blue jay
pollen - horseflies - raccoons
earwig - dragonfly - mockingbird
leaf - Florida red scale - ladybug - blue jay
garbage - fly - spider - wasp
nectar - bee - ants - birds
leaf - cone-headed grasshopper - cricket - grack
oak leaf - caterpillar - beetle - woodpecker
sprouts - rabbit
wild fruit - cardinal

PROCEDURES (Cont'd.)

More Complex Food Chains



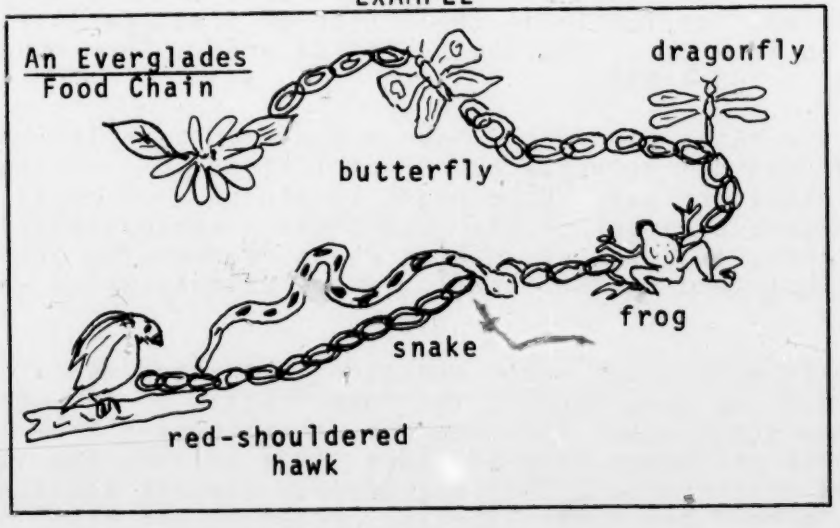




PROCEDURES (Cont'd.)

Have each student make a food chain by beginning with a crayon rubbing of a leaf or replica of other type plant food, then making pictures of animal members of a food chain. Cut these out, attach them to a large piece of construction paper or oak tag with accordion pleated strips of construction paper, so they stand out. Make paper chains and connect the members of the chains.

EXAMPLE



PROCEDURES (Cont'd.)

VII.

Read the seventh page of the "Ecky" book. "Food Web. Because many organisms are part of different food chains we say they make a food web."

Study the web on this page. What is the most important animal in this web? (Insects. They are the basis of many many food chains. They also are invaluable in their role of plant fertilization.) Do a study on insects of the South Florida area. Show county film "Insects" - 595.7-838.

Make a human food web. Make a sun from a yellow ball or piece of poster board. Attach a number of 10-foot long strings to the "sun" - radiating out. Make signs to pin on each pupil so that each may represent a member of the food chain - approximately 6 names of green plants, 10 names of insects which feed on the green plants, 6 birds that feed on the insects, and 3 animals which would eat the birds.

Pupils with plant names are each instructed to take hold of a string near the sun, forming the inner circle of the web. "Insects" choose one green plant and take the string coming from it. "Birds" then choose an insect prey and take their string; the remaining predators do likewise. Then the teacher strings additional strings between "birds" and other insects, predators and other birds, etc., to form a web-like effect.

VIII.

Read, study, and discuss the eighth, ninth, tenth, and eleventh pages of the "Ecky" book.

Review the lesson on photosynthesis.

Show the county films "Food: Energy from the Sun" - 574.1-671 and "Animal Predators and the Balance of Nature" - 591.5-3030.

Discuss herbivores, carnivores, and omnivores. Working on chalk board or overhead projector, have the pupils compose a chart similar to the following one. Teacher may provide some of the following as examples and add any to the pupils' lists which they do not suggest. Pupils should copy chart and add to their notebooks.

PROCEDURES (Cont'd.)

MEMBERS OF THE FOOD CHAIN

Producers	Herbivores	Omnivores	Carnivores	Decomposers
Use energy from sun to grow	Eat only plants	Eat plants and other animals	Eat only other animals	Cause decay returning nutrients and minerals to earth
Green plants			Predators Scavengers Insectivores	
	deer		Venus's fly trap	fungi
trees	muskrat	skunk	sundew	mushroom
herbs	beaver	bear	pitcher plant	toadstool
grasses	song sparrow	oppossum	weasel fox	mildew
shrubs	porcupine	raccoon	badger	bacteria
ferns	moose	deer mouse	shrew	
mosses	rabbits	crow	bat	
algae	hares	bluejay	robin	
	*field mice (voles)	pig	hawk	
	snails	chicken	owl	
	tadpoles	rat	heron	
	earthworms	man	alligator	
	sowbugs		wolf	
	cardinal		seal	
	*box turtle		snake	
	cow		lizard	
	goose		frog	
	pigeon		spider	
			vulture	
			kingfisher	
			snapping turtle	
			cougar	
			*coyote	
			mosquito	
			sunfish	
			house cat	

*Some animals usually classified as either a herbivore or carnivore will occasionally eat something that would put them in the other category. In other words, a few of the animals named here in column 2 or 4 could be placed in column 3, Omnivores.

PROCEDURES (Cont'd.)

Have the pupils construct the IEE Matter and Energy Cycle Wheel.

Have the pupils construct their own Matter and Energy Wheel with their own choice of producers and consumers, using the following directions. (If they are not familiar with the compass do some introductory work with it. Introduce or review the words "sector," "diameter," and "radius.")

Make a Matter and Energy Cycle!

1. Obtain two pieces of heavy paper or light cardboard, compass, crayons, ruler.

2. Placing the point of the compass in the center of the paper, stretch it out until it is as large as it can get without going off the paper on any side.

3. Draw your circle, mark the center point.

4. With the compass still in the same setting, mark off a sector at the top of the circle by placing the compass point on one side and marking the circle with the pencil side. Then immediately mark the point where the compass point was placed.

5. Continue going around the circle, placing the compass points on the marks you have made and marking the next point on the circle that the pencil hits. When you have gone all the way around you will have six marks.

6. Take your ruler and join opposite marks on the circle, making sure the center mark is lined up. You will have three diameters drawn. (Diameter: line passing from one side to the other through the center of a circle.)

7. On your second piece of paper mark out a circle somewhat smaller than the first. Mark the center point.

8. Mark off only two points with your compass. Join each point to the center of the circle (forming a pie-shaped sector). These lines are called radius lines. (Radius: any line going straight from the center to the outside of a circle.)

9. Cut this pie-shaped sector from the circle--but leave enough in center for brass fastener (see illustration).

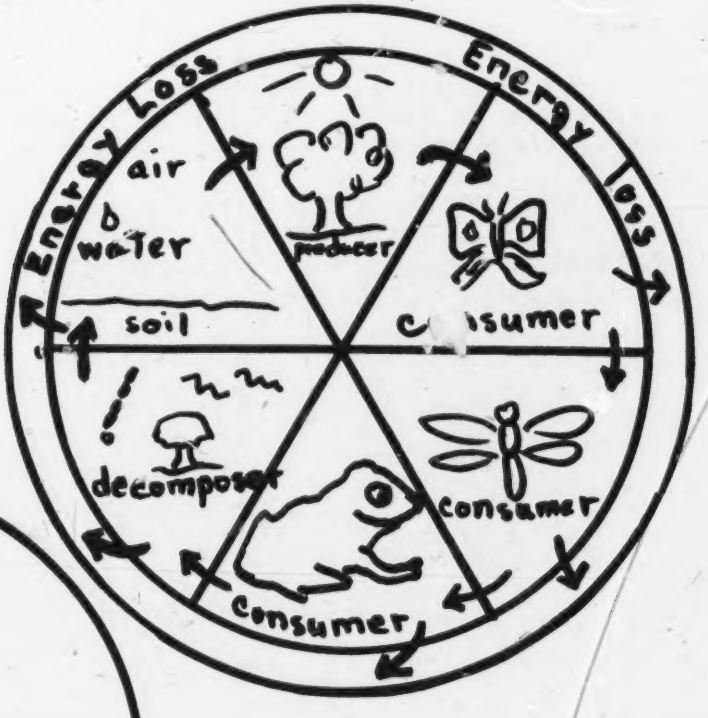
PROCEDURES (Cont'd.)

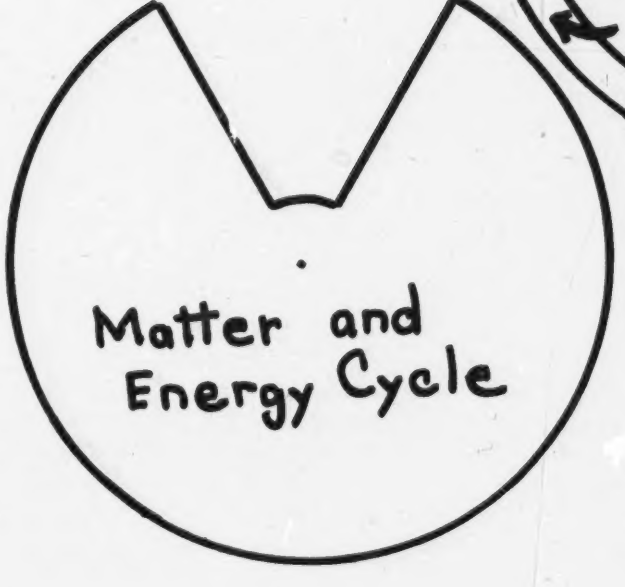
10. Do your art work on the subdivided circle.

    (1) Sun and producers.
    (2) First consumer.
    (3) Second consumer.
    (4) Third consumer.
    (5) Decomposers.
    (6) Return to earth, air, water.

11. Attach the blank circle to the subdivided circle with a brass fastener in the middle (after cutting them out).

12. Label your cycle "Matter and Energy Cycle."





PROCEDURES (Cont'd.)

IX.

Read, study, and discuss the "Ecosystem" page of your "Ecky" book.

Have the pupils look up the words "Ecology" and "System" in the dictionary. Have them write what they think "Ecosystem" means. Using their Matter and Energy Wheels, they are to find the meaning of "self-renewing." (Remind them of the film "Plant-Animal Communities: Interrelationships" and review the meaning of "community.") They are to write their interpretation of what it means.

Each pupil is to choose a particular ecosystem (be it a terrarium or the world) and do a research and report (written, oral, visual, etc.) on that ecosystem.

Show county films "Ecological System - Antarctica" - 919.9-3223, "Desert, The" - 574.5-0674, "Everglades: Conserving a Balanced Community" - 919.59-1739, and "Community Beneath the Sea" - 591.55-3379. (Each is an example of an ecosystem.)

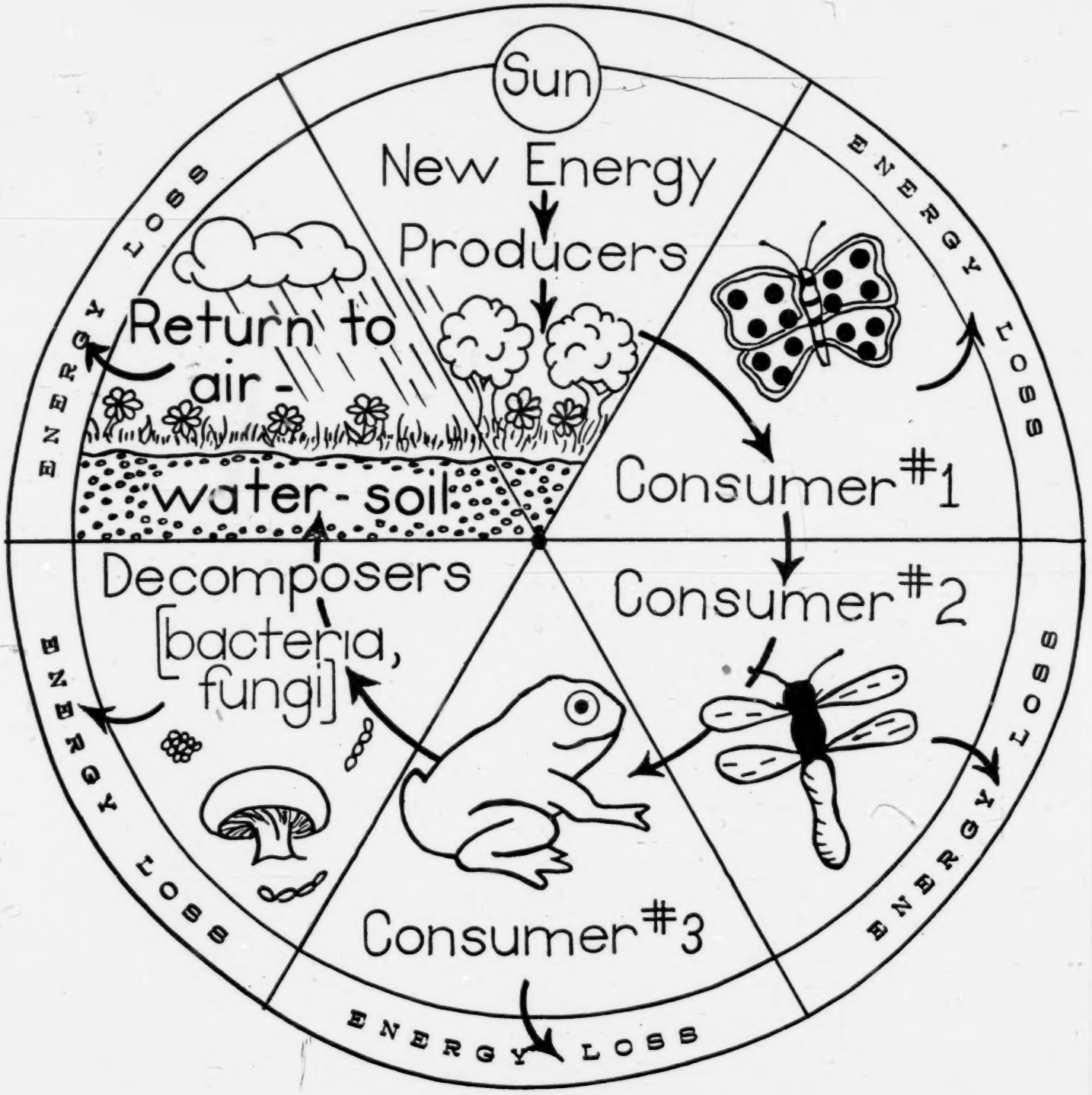
TEXT FROM IEE BOOKLET

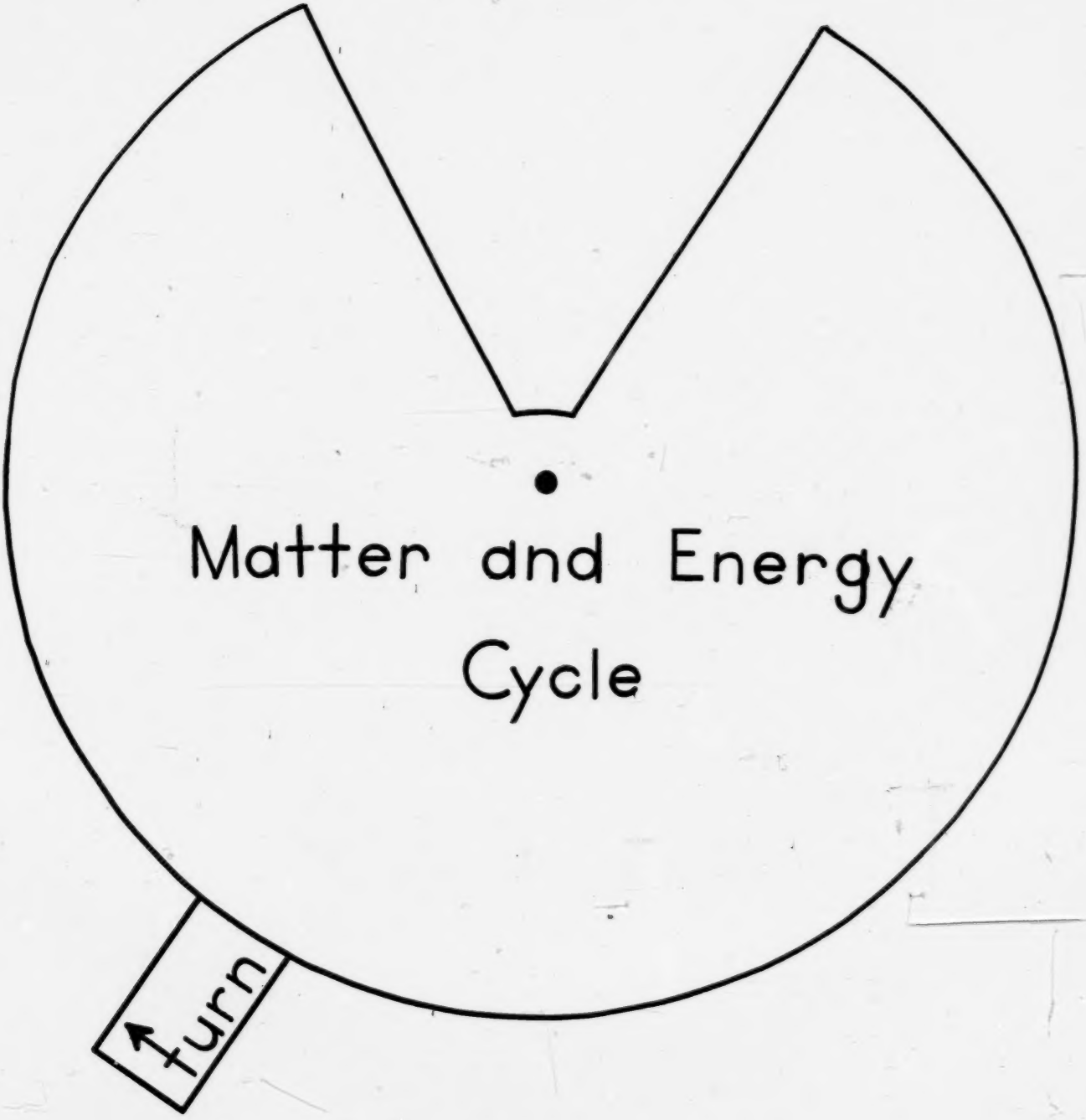
"ECKY SAYS, 'BRUSH UP ON YOUR ECOLOGY'"

ENVIRONMENT	- The sum total of all living and non-living things.
INTERRELATIONSHIPS	- Acting upon one another.
ECOLOGY	- The study of the interrelationships of all living and non-living things.
ORGANISMS	- All living things.
ENERGY	- The ability or active strength to do anything.
FOOD CHAINS	- Systems by which all organisms get energy through food.
FOOD WEB	- Because many organisms are part of different food chains, we say they make a food web.
PRODUCERS	- Organisms (green plants) which take energy from the sun and use it to produce their own food and grow.
CONSUMERS	- Organisms that get their food and energy from other organisms (producers and other consumers).
DECOMPOSERS	- Organisms (bacteria, fungi, toadstools) that decay or break down other materials, returning the elements of which they are made to the soil, air, and water.
ENERGY CYCLE	- Energy from the sun is taken by the producers, passed on to consumers, and returned to the producers. Much energy is lost in the transfer so new energy from the sun is always needed.
ECOSYSTEMS	- Any self-renewing community populated by producers, consumers, and decomposers.

ECKY SAYS, "HOPE YOU MADE A CLEAN SWEEP!"

Matter and Energy Cycle




Matter and Energy
Cycle
turn